

Practice Materials (1 of 2)

Matching

VERSION 1.0

The Art of 3D **Computer Animation and Effects**

Third Edition

by

Isaac V. Kerlow

Use these Matching exercises
to review and practice the concepts and techniques explained in
"The Art of 3D Computer Animation and Effects," 3rd Edition.

Answers at end of document.

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Matching

Chapter 1. Animation, Art, and Technology in Context

- ___ Geometry Engine
- ___ The Lion King
- ___ Terminator II
- ___ The University of Utah
- ___ 1990s
- ___ Genesis Effect
- ___ TRON
- ___ 1960s
- ___ The Abyss
- ___ Ivan Sutherland
- a. Produced in 1982, it was the first feature film with over 20 minutes of computer animation, most of it composited with live action.
- b. The first visual effects shot that was created entirely with three-dimensional computer animation techniques, and also one of the earliest examples of procedural modeling and animation.
- c. Film with the first three-dimensional computer animated character that was realistic enough to blend with the live action background plates.
- d. Time-sharing computer systems were popular during this decade.
- e. A pioneering computer chip that powered some of the visual workstations manufactured by Silicon Graphics Inc. during the early 1980s.
- f. Its computer-generated stampede is one of the earliest examples of crowd simulation in feature animation.
- g. By the end of this decade the use of company computer intranets for communications and file transfer and management became the standard practice at most leading centers of digital production.
- h. This 1991 film was the first mainstream blockbuster movie to include great morphing effects and also the first convincing simulation of natural human motion.
- i. Developed the first interactive system, called Sketchpad, in the early 1960s.
- j. During the 1970s it became a center of innovation in three-dimensional computer graphics research with contributions that included Gouraud and Phong shading, and image and bump texture mapping techniques.
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Chapter 2. The Digital Production Process

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|-------------------------------|--|
| ___ Character sheets | a. It exists when files created with previous versions of the software are compatible with new software upgrades. |
| ___ Network server | b. Are created to help set the visual mood of every scene in the animation project. |
| ___ Animatic | c. Have a profound impact on the realities of working in digital production because they define many of the skills that are needed to complete a project. |
| ___ IK chains | d. Makes sure that all the group leaders follow the storyboard and the agreed production strategies. |
| ___ Preproduction | e. Its main purpose is to assist other computers to fetch and send data. |
| ___ Texture development | f. Consists of blocking out the positions and motions of the camera. |
| ___ Software upgrades | g. In general they are offered at a nominal fee, except when the extent of the improvements is such that it is considered a new version of the product. |
| ___ Production coordinator | h. Preliminary version of a computer animation and used to visualize how the final project may be structured. |
| ___ Visual effects supervisor | i. Network bandwidth of 154 megabits per second. |
| ___ Color keys | j. Makes sure that all the computer animators have the equipment, programs, and technical support they need to do their jobs. |
| ___ Upward compatibility | k. Includes nonvisual tasks such as screenwriting and planning the management of the project, as well as visual tasks such as storyboarding and developing the overall visual look of the project. |
| ___ Storyboard | l. Indispensable tool for doing a technical breakdown of each shot. |
| ___ ATM | m. The internal skeletons that are often used to animate characters. |
| ___ Scene layout | n. Define the attitudes and poses of the characters in the form of body positions and facial expressions. |
| ___ Technical developments | o. Often done by teams of painters and technical directors. |

Matching

Chapter 3. Basic Modeling Concepts

- ___ Polygon
 - ___ Rendering
 - ___ Sketching on paper
 - ___ Vector
 - ___ File conversion
 - ___ Thumb rule
 - ___ DXF
 - ___ Constructive solid geometry
 - ___ Origin
 - ___ Preferences file
 - ___ Perspective
- a. A popular file format supported by a large number of modeling applications.
 - b. Modeling techniques used when three-dimensional models are to be manufactured under computer control.
 - c. Many modeling decisions have a direct impact on this stage of the creative process.
 - d. The point at which the XYZ axes intersect.
 - e. A highly recommended technique that helps to foresee potential modeling problems and to choose a modeling strategy.
 - f. Its contents may affect the behavior and performance of the modeling program.
 - g. A transformation that projects three-dimensional environments onto a flat surface.
 - h. A straight line with a direction.
 - i. Can be used to easily determine the direction of rotations.
 - j. Closed plane bounded by straight lines.
 - k. Allows computer graphics software to import models that were not saved in the program's native file format.
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Chapter 4. Basic Modeling Techniques

- ___ Naming objects
 - ___ Facets
 - ___ Unfolding skin
 - ___ Text tools
 - ___ Cardinal spline
 - ___ Hierarchy
 - ___ Surfaces of revolution
 - ___ Ungrouping
 - ___ Bézier curve
 - ___ Terrains
- a. When used to model cylinders and cones it creates results similar to those that can be created with geometric primitive tools.
 - b. A curve that has tangent points in addition to control points.
 - c. Returns all objects to a stand-alone status.
 - d. Complex structures created with relatively little modeling work.
 - e. Their number defines the geometric smoothness of polygonal models.
 - f. Useful for quickly identifying models in a scene.
 - g. Capable of creating smooth letterforms.
 - h. A curve that passes through all of its control points.
 - i. Useful technique for creating two-dimensional blueprints that can be easily assembled into a three-dimensional scale model.
 - j. Capable of creating complex relations where children usually inherit most of the parents' attributes.
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Matching

Chapter 5. Advanced Modeling Techniques

- ___ Degree of rounding
 - ___ Beveling
 - ___ Fillets
 - ___ Random distortion
 - ___ Lineage
 - ___ Patch
 - ___ Freeform surfaces
 - ___ Blobby surfaces
 - ___ Shape interpolation
 - ___ Trimming
 - ___ L-systems
 - ___ Skinning
 - ___ Skin surfaces
 - ___ Fractals
- a. Useful to create three-dimensional objects or surfaces with holes.
 - b. Can be created from two curves that are positioned opposite to one another.
 - c. Can be used to animate the effect of shaking by displacing the points of the model back and forth through time.
 - d. Name given to a variety of curved surfaces including bicubic surface patches and Bézier surfaces.
 - e. Works by truncating the hard edge between two surfaces and replacing it with a slanted plane.
 - f. Useful in creating models that are described as series of two-dimensional contours.
 - g. Can be created manually with a variety of modeling techniques and then be positioned around a skeleton.
 - h. Mathematical models that represent structures that branch in parallel.
 - i. Modeling technique that employs starting shapes and generators.
 - j. Constantly regenerate as they move in and out of the areas of influence of similar elements.
 - k. Transfer of attributes from one level of a simulated plant to another at the time of branching.
 - l. Can be used to cover small gaps that may develop on the surface of models during simple rotations.
 - m. Controlled by the number of segments used to define the smooth transition between two adjacent surfaces.
 - n. Custom decorative trims that extend along the edge.
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Chapter 6. Basic Rendering Concepts

- ___ Efficient modeling
 - ___ PICT
 - ___ Hardware
 - ___ QuickTime
 - ___ Adobe Photoshop
 - ___ Preference File
 - ___ TIFF
 - ___ Raytracing
 - ___ EPS
- a. Provides a range of levels of image compression and quality.
 - b. Its contents control many fundamental aspects of the rendering process.
 - c. File format useful for transferring rendered images to prepress or desktop publishing software.
 - d. Rendering technique that is capable of rendering just one section of the scene for previewing purposes.
 - e. Useful file format when high-quality line drawings of wireframe renderings are needed.
 - f. Its speed often determines the speed of the rendering process.
 - g. Usually streamlines the rendering process.
 - h. Software often used for file format conversion.
 - i. One of the most versatile and popular file formats.
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Chapter 7. The Camera

- ___ Aspect ratio
 - ___ Navigation
 - ___ Reverse angle shot
 - ___ Low angle shot
 - ___ Long shot
 - ___ Boom
 - ___ 135 mm lens
 - ___ 50 mm lens
 - ___ Wide shot
 - ___ Cone of vision
 - ___ Tilt
- a. Rotation of the camera on its X axis.
 - b. Presents enough of the scene to include the full bodies of five characters.
 - c. Portion of the three-dimensional space that is seen through the camera.
 - d. Translation of the camera along its Y axis.
 - e. Offers an adequate 46 degree angle of view with very little perspective distortion and with average depth of field.
 - f. The process of placing a camera in three-dimensional space.
 - g. Places the camera below the point of interest and looks up.
 - h. Commonly used in conversations between two people.
 - i. Defined by the relation between the width and the height of the image plane.
 - j. Has excellent abilities for close framing, but it flattens the perspective.
 - k. Focuses on the scenery and barely permits recognition of individual characters in the environment.
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Chapter 8. Lighting

- ___ Scenery
 - ___ Spot light
 - ___ Overhead light
 - ___ Point light
 - ___ Infinite lights
 - ___ Ordinary
 - ___ Additive
 - ___ Visible light sources
 - ___ Decay
 - ___ Penumbra
 - ___ HSB
 - ___ Frontal from below
 - ___ Fall off
- a. Color systems that are based on lights, not on pigments.
 - b. Their light rays reach the scene parallel to each other.
 - c. Value that controls the sharpness or softness of the edges of spot lights.
 - d. Position of a light source that can be very effective for accentuating "scary" moments.
 - e. Can be seen by the camera and the viewer.
 - f. Value of light controls the force of a light source and, as a result, how far the light travels.
 - g. A type of light source that casts light in all directions.
 - h. Used by many programs to define the color of lights.
 - i. Very sensitive to colored lights.
 - j. A type of light source that is also called directional light.
 - k. Can be used to add depth and drama to a scene.
 - l. Name given to a stage lighting arrangement that consists of two spot lights at a 90-degree angle in relation to each other, and rotated 45 degrees around both the vertical and horizontal axes.
 - m. The area of the shadow that blends with other lights in the environment.
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Matching

Chapter 9. Shading and Surface Characteristics

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| <p>___ U parameter</p> <p>___ Image mapping</p> <p>___ Ambient reflection</p> <p>___ Reflection maps</p> <p>___ Spatial aliasing</p> <p>___ Cubical projection</p> <p>___ Matte surfaces</p> <p>___ Map blending</p> <p>___ Color maps</p> <p>___ Volume shaders</p> <p>___ Mask</p> <p>___ Specular shading</p> <p>___ Surface normals</p> <p>___ Surface shader</p> <p>___ Fog</p> <p>___ Spherical projection</p> <p>___ Motion blur</p> <p>___ Aerial perspective</p> <p>___ Faceted surface shading</p> | <p>a. Image that protects a surface or portions of it.</p> <p>b. Collection of surface characteristics and shading techniques that are applied to an object during the rendering process.</p> <p>c. Cluster of particles with uniform density that is placed in front of the camera.</p> <p>d. A horizontal value that stretches from 0 to 1 in the parameter space of curved surfaces.</p> <p>e. Determines the way in which surface layers are combined with the surface of the object as well as with other surface layers.</p> <p>f. Vectors located on the surface of a polygon.</p> <p>g. Defines the characteristics of three-dimensional spaces with a variety of materials that affect light as it travels through them.</p> <p>h. A two-dimensional image is projected on the surface of a three-dimensional object.</p> <p>i. Usually monochromatic because the brightness values determine the simulation of reflectivity.</p> <p>j. Occurs when the computer-generated image is sampled at a lower resolution than the original data.</p> <p>k. A form of temporal aliasing due to samples that are too far apart from each other to capture motion details.</p> <p>l. Repeats an image on each of the six sides of a cube.</p> <p>m. Wraps a rectangular map around a surface until the opposite sides meet, and the top and bottom are stretched and pinched.</p> <p>n. Techniques used to depict depth in a two-dimensional image by simulating the atmospheric effects of light, temperature, and humidity on objects situated far away from the observer.</p> <p>o. Assigns a constant shading value to each visible polygon on the surface.</p> <p>p. Can be simulated by using a combination of ambient and diffuse reflections. (more...)</p> |
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- q. The type of surface reflection that reacts only to the intensity and color of the ambient light.
- r. Calculates the shading at every point on the surface of a polygon by interpolating the vertex normals.
- s. Often used to represent the images and labels that we find on packages and containers.

Matching

- ___ Plot points
- ___ Effects animation
- ___ Sequence
- ___ Parallel action
- ___ Frame
- ___ Visual line of action
- ___ Animatronic
- ___ Storyboard
- ___ Elapsed timed
- ___ Inverse kinematics
- ___ Overlapping motion
- ___ Character sheets

Chapter 10. Basic Concepts of Animation

- a. Series of panels that contain a visual interpretation of the screenplay.
- b. Specifies the absolute length of a sequence in hours, minutes, seconds, and frames.
- c. Used to define emotions and attitudes with body positions and facial expressions.
- d. A computer-controlled model that can be animated in real time.
- e. Occurs when some motions start before others conclude.
- f. The smallest unit of animation.
- g. Event in storyline that keeps the action moving.
- h. Useful for animating models by specifying the final angle positions of some of the key joints in the model.
- i. Most of the animation that is not character oriented.
- j. Occurs when the audience is shown actions that take place at the same time but in different places.
- k. Succession of camera shots that are connected to each other because they develop the same aspect of the action.
- l. Guides the eye of the viewer by determining the position and sequence of the motions in the scene.

Matching

Chapter 11. Basic Computer Animation Techniques

- ___ Cardinal
 - ___ Interpolation
 - ___ Focal length
 - ___ Depth of field
 - ___ Ease
 - ___ Freeform lattice
 - ___ Truck
 - ___ Texture
 - ___ Zoom
 - ___ Morphing
 - ___ Degrees of freedom
 - ___ Tracking
 - ___ Linear
 - ___ Null parent
 - ___ Motion path
- a. Used to create three-dimensional transformations of shape.
 - b. An external structure for controlling motion.
 - c. Used to express the ability of a joint to rotate around one or several axes.
 - d. Interpolation that produces equally spaced in-between frames.
 - e. Defined by the areas that are contiguous to the focal plane.
 - f. Needs to know where the front of the object that is linked to it is.
 - g. Technique used to create sequences of in-between frames by averaging keyframe information.
 - h. Node in the hierarchy that does not relate to any specific part in the model but that controls several objects.
 - i. A variation of a dolly camera move that moves along with the subject.
 - j. Interpolation that takes into account variations of speed over time.
 - k. A camera move that goes in or out of the scene.
 - l. Animating it usually requires more setup time than animating color because of the number of parameter curves involved.
 - m. A camera move achieved by slowly changing the focal length of a camera.
 - n. A spline that matches the control points very tightly.
 - o. Defined by the relation between the near and the far clipping planes.
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Matching

Chapter 12. Advanced Computer Animation Techniques

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| ___ Motion dynamics | a. Allows to capture all kinds of information in real time through a variety of input peripherals. |
| ___ Inverse kinematics | b. Name given to both motion rides and large—usually multi-player—videogames. |
| ___ Environmental density | c. Animation techniques that generate realistic motion of objects by simulating their physical properties and the natural laws of physical motion. |
| ___ Mass | d. Their surfaces do not move much after a collision. |
| ___ Collision detection | e. When it impacts a surface it is strongest at the center of the impact area and weaker at the edges. |
| ___ Filtered motion | f. Entertainment applications that are based on computer animations that try to simulate reality. |
| ___ Rigid objects | g. Calculates the motion of entire skeletons by specifying the final angle positions of some of the key joints that define the motion. |
| ___ Channel animation | h. Using it can add a lot of processing time and production expense to a scene because the position and dynamic properties of objects must be constantly checked to avoid overlapping objects. |
| ___ Conical force | i. A form of motion capture that is usually based on tracing joint positions from live action footage. |
| ___ Torques | j. Occurs during the motion-capture process when the hierarchies of real actors and virtual actors are structured in different ways. |
| ___ Virtual reality | k. An example of a resisting force. |
| ___ Location-based entertainment | l. Determined by the product of the volume of an object and its density. |
| ___ Rotoscoping | m. The motion they produce is in the form of rotations or torsions with varying amounts of rotational velocity and acceleration, and changing orientations. |

Matching

- ___ Camera reports
- ___ Visual effects producer
- ___ Motion control system
- ___ Markers
- ___ Practical effects
- ___ 3D animatics
- ___ Survey data
- ___ Time freeze
- ___ 4K film scanning
- ___ Visual effects supervisor

Chapter 13

- a. Used to help the director and cinematographer to conceptualize and refine a shot, and also to plan the actual shooting.
- b. Includes ambient and incident light readings, and the position of markers and their distance and angle from the camera.
- c. Created on locations, a sound stage or a miniature set, and include real explosions, stunts, and animatronics.
- d. Also known as time slice or bullet-time, and is a variation of the photogrammetry technique.
- e. Spends a considerable amount of time on the set, in the film laboratory, and at the postproduction facility.
- f. Used today in a limited fashion due to the huge file sizes and increased cost of processing.
- Precise motorized crane that moves a camera along a specific path in response to a well-defined numerical input.
- g. Essential to aiding the camera tracking process and made of different materials including reflective tape or small plastic spheres.
- h. Responsible for making sure that the team delivers the expected effects shots within the budget and deadline.
- i. Usually include the lens focal length and aperture, as well as positional and rotational information.

Matching

- ___ Soft cut
- ___ Dither cross-dissolve
- ___ Image layers
- ___ NTSC color filters
- ___ Cross-dissolve

Chapter 14. Retouching and Compositing

- a. Contains a black-and-white image that masks or protects parts of one or several of the image layers.
- b. Set primarily by the length of the shots in a sequence.
- c. Protect portions of the image during compositing.
- d. Apply mathematical operations to single pixels or groups of them in order to change their color value.

Matching (cont...)

- ___ Histogram
- ___ Color dithering
- ___ Animatic
- ___ Tempo
- ___ Transition effects
- ___ Resampling
- ___ Masks
- ___ Rough cut
- ___ Parameter curves
- ___ Sharpening filters
- ___ Nonlinear editing
- ___ Cut
- ___ Rhythm
- ___ Digital filters
- ___ Transition effects
- ___ Alpha channel
- ___ Image sequencing
- ___ Interpolation techniques
- ___ Color look-up table

Chapter 14. Retouching and Compositing (cont...)

- e. Made by placing the tail of a sequence right next to the head of another sequence.
- f. Used to separately display each of the component or primary colors of an image in several color modes, including RGB, CMYK, and HSL.
- g. Uses a coarse pattern to fade a pair of shots into one another.
- h. Graphs that represent and control different attributes of an image, such as brightness and color.
- i. Often used to increase the contrast of adjacent pixels.
- j. Contains the finished renderings and final motion in a computer animation, but the final arrangement of the sequences and the transitions are not implemented.
- k. Term used to describe image sequencing systems that have instant access to the source images.
- l. Used to create new pixel values by averaging the values of existing pixels in different ways.
- m. Clip the RGB colors that are beyond the chromatic range of video.
- n. Transition effect where two shots fade into each other.
- o. Changing the spatial or color resolution of an image.
- p. Techniques used to blend and composite moving images.
- q. A preliminary version of a computer animation used to visualize how the final project may look.
- r. The arrangement and composition of moving images.
- s. Limited palette that represents a larger selection of colors.
- t. Combination of a cut and a cross-dissolve.
- u. Simulates shades of color with dot patterns.
- v. Define the temporal and spatial relation between shots.
- w. Graph of the distribution of the image pixels throughout the grayscale.
- x. Sets the pace of a computer animation.

Matching

Chapter 15. Output

- | | |
|-------------------------|---|
| ___ Kilobits per second | a. Used to measure the image resolution of a specific input or output peripheral device. |
| ___ JPEG | b. Indicate the action safe areas of NTSC video that keep the edges of computer animations from being off the video frame. |
| ___ Lpi | c. Used to measure the bandwidth of digital networks. |
| ___ Field guides | d. The amount of detailed information contained in an image or a sequence of images. |
| ___ Film recorder | e. Factor that helps to compensate for the loss of information that happens between the voltages sent by the computer to the monitor and the light output by the monitor. |
| ___ Playback controller | f. The smallest unit used to measure image resolution. |
| ___ DTAs | g. Used to measure the bandwidth or speeds of modems operating on phone lines. |
| ___ Spatial resolution | h. Based on a "lossy" compression scheme that removes data that is redundant or imperceptible to the human eye. |
| ___ Dpi | i. Usually contains a photographic camera that records the image displayed on a black and white monitor through a wheel of color filters. |
| ___ Pixel | j. Common bandwidth of the internal data channels of computers used for visual creation. |
| ___ Megabits per second | k. Defined by the relation between the dimensions of an image and the number of pixels in the image. |
| ___ Resolution | l. The compression technique of this popular file format is based on the removal of data that is identical or similar from one frame to another. |
| ___ Gamma | m. Displayed right below the window of a QuickTime file. |
| ___ MPEG | n. Used to measure the number of rows of dots in the halftone screens of mechanical reproduction techniques. |
| ___ 10–40 mb per second | o. Components of all output. |

Matching Answers

Chapter 1

a. TRON, b. Genesis Effect, c. The Abyss, d. 1960s, e. Geometry Engine, f. The Lion King, g. 1990s, h. Terminator II, i. Ivan Sutherland, j. The University of Utah.

Chapter 2

a. Upward compatibility, b. Color keys, c. Technical developments, d. Visual effects supervisor, e. Network server, f. Scene layout, g. software upgrades, h. Animatic, i. ATM, j. Production coordinator, k. Preproduction, l. Storyboard, m. IK chains, n. Character sheets, o. Texture development.

Chapter 3

a. DXF, b. Constructive solid geometry, c. Rendering, d. Origin, e. Sketching on paper, f. Preferences file, g. Perspective, h. Vector, i. Thumb rule, j. Polygon, k. File conversion.

Chapter 4

a. Surfaces of revolution, b. Bézier curve, c. Ungrouping, d. Terrains, e. Facets, f. Naming objects, g. Text tools, h. Cardinal spline, i. Unfolding skin, j. Hierarchy.

Chapter 5

a. Trimming, b. Patch, c. Random distortion; d. Freeform surfaces, e. Beveling, f. Skinning, g. Skin surfaces, h. L-systems, i. Fractals, j. Blobby surfaces, k. Lineage, l. Shape interpolation, m. Degree of rounding; n. Fillets.

Chapter 6

a. Tilt, b. Wide shot, c. Cone of vision, d. Boom, e. 50 mm lens, f. Navigation, g. Low angle shot, h. Reverse angle shot, i. Aspect ratio, j. 135 mm lens, k. Long shot.

Chapter 7

a. QuickTime, b. Preference File, c. TIFF, d. Raytracing, e. EPS, f. Hardware, g. Efficient modeling, h. Adobe Photoshop, i. PICT.

Chapter 8

a. Mask, b. Surface shader, c. Fog, d. U parameter, e. Map blending, f. Surface normals, g. Volume shaders, h. Image mapping, i. Reflection maps, j. Spatial aliasing, k. Motion blur, l. Cubical projection, m. Spherical projection, n. Aerial perspective, o. Faceted surface shading, p. Matte surfaces, q. Ambient reflection, r. Specular shading, s. Color maps.

Chapter 9

a. Additive, b. Infinite lights, c. Fall-off, d. Frontal from below, e. Visible light sources, f. Decay, g. Point light, h. HSB, i. Scenery, j. Spot light, k. Overhead light, l. Ordinary, m. Penumbra.

Chapter 10

a. Morphing, b. Freeform lattice, c. Degrees of freedom, d. Linear, e. Depth of field, f. Motion path, g. Interpolation, h. Null parent, i. Tracking, j. Ease, k. Truck, l. Texture, m. Zoom, n. Cardinal, o. Focal length.

Chapter 11

a. Storyboard, b. Elapsed time, c. Character sheets, d. Animatronic, e. Overlapping motion, f. Frame, g. Plot points, h. Inverse kinematics, i. Effects animation, j. Parallel action, k. Sequence, l. Visual line of action.

Chapter 12

a. Channel Animation, b. Location-based Entertainment, c. Motion Dynamics, d. Rigid Objects, e. Conical Force, f. Virtual Reality, g. Inverse Kinematics, h. Collision Detection, i. Rotoscoping, j. Filtered Motion, k. Environmental Density, l. Mass, m. Torques.

Chapter 13

a.

Chapter 14

a. Alpha channel, b. Tempo, c. Masks, d. Digital filters, e. Cut, f. Image layers, g. Dither cross-dissolve, h. Parameter curves, i. Sharpening filters, j. Rough cut, k. Nonlinear editing, l. Interpolation techniques, m. NTSC color filters, n. Cross-dissolve, o. Resampling, p. Transition effects, q. Animatic, r. Image sequencing, s. Color look-up table, t. Soft cut, u. Color dithering, v. Transition effects, w. Histogram, x. Rhythm.

Chapter 15

a. dpi, b. Field guides, c. Megabits per second, d. Resolution, e. Gamma, f. Pixel, g. Kilobits per second, h. JPEG, i. Film recorder, j. 10-40 mb per second, k. Spatial resolution, l. MPEG, m. Playback controller, n. Lpi, o. DTAs.

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